PB89-135321

Superfund Record of Decision (EPA Region 7) Big River Sand Site, Wichita, Kansas (First Remedial Action), June 1988

(U.S.) Environmental Protection Agency
Washington, DC

28 Jun 88

U.S. Department of Commerce
National Technical Information Service
NTIS

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R07-88/011
June 1988

PB89-135321

EPA

Superfund Record of Decision:

Big River Sand, KS

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The Big River Sand (BRS) site is located one-half mile west of the Arkansas River and adjacent to the Wichita Valley Center Floodway, in Sedwick County, Kansas. The site consists of approximately 123 acres, half of which has been extensively mined for sand and gravel. Sand and gravel mining is still active on the property. During the early 1970s, approximately 2,000 drums of paint-related waste were disposed of on the eastern portion of the site, adjacent to a five-acre sand quarry lake. In 1978, 80 acres of the site containing the drum storage area were sold to BRS. In 1982, as a condition of the sales agreement, the drums were moved to an unsold portion of the site. Nearly 200 drums were transferred before the Kansas Department of Health and Environment (KDHE) halted the action because the area was not permitted to store or dispose of the waste. KDHE conducted the initial site inspection in August 1982 and identified damaged, corroded, and leaking drums. Waste solvents and paint sludges from several drums contained metals and VOCs. Waste solvents from the barrels were determined to be hazardous due to their ignitability. Mr. Eisenring, a PRP, was ordered by KDHE in September 1982 to conduct a removal and site cleanup. These occurred between 1982 and 1984. KDHE sampling detected arsenic, lead, and selenium in drinking water wells, and VOCs, including toluene, in onsite soils and in monitoring wells.
(See Attacned Sheet)

17. Document Analysis a. Descriptors

Record of Decision
Big River Sand, KS
First Remedial Action - Final
Contaminated Media: gw, soil
Key Contaminants: metals (arsenic, lead, selenium), VOCs (toluene)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 57
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(See ANSI-Z39.18) See Instructions on Reverse OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

EPA/ROD/R08-88/022
[illegible] River Sand, KS
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16. ABSTRACT (continued)

It has been determined that the site does not pose a significant threat to public health, welfare, and the environment. Therefore, no further action has been selected as the preferred alternative. The estimated future cost, if sampling is conducted in year five, is $5,800.

RECORD OF DECISION

DECLARATION

Big River Sand Company Site

Wichita, Kansas

Prepared By:

U.S. Environmental Protection Agency

Region VII

Kansas City, Kansas

June 1988

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

SITE NAME AND LOCATION

Big River Sand Company Site
Wichita, Kansas

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Big River Sand Company site in Wichita, Kansas, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record for this site. The attached index identifies the items which comprise the administrative record upon which the selection of the remedial action is based.

The State of Kansas concurs on the selected remedy.

DESCRIPTION OF THE SELECTED REMEDY

The U.S. Environmental Protection Agency (EPA), in consultation with the State of Kansas, has determined that the Big River Sand Company site does not pose a significant threat to public health and welfare and the environment and, therefore, taking additional remedial measures is not appropriate. This determination is based on: 1) Sampling and site cleanup activities conducted by the State between 1982 and 1985; 2) Remedial Investigation activities conducted by EPA in 1986 and 1987; 3) Health consultation provided by the Agency for Toxic Substances and Disease Registry; and 4) Monitoring conducted by EPA in March 1988. The "No Further Action" alternative is the selected remedy for the Big River Sand Company site. Furthermore, it is recommended to initiate procedures to delete the site from the National Priorities List.

DECLARATION

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate to the remedial action and is cost-effective. Section 121 of CERCLA identifies a statutory preference for treatment. The selected remedy does not include treatment since contamination at the site does not pose a significant threat to public health and the environment.

Because this remedy will result in a hazardous substance remaining onsite, a review will be conducted within five years to ensure that the remedy continues to provide adequate protection of human health and the environment.

Morris Kay
Regional Administrator

6-28-88
Date

RECORD OF DECISION

DECISION SUMMARY

Big River Sand Company Superfund Site

Wichita, Kansas

Prepared By:

U.S. Environmental Protection Agency

Region VII

Kansas City, Kansas

June 1988

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1.0 INTRODUCTION

During the early 1970's, approximately 2,000 drums of paint-related wastes were disposed of at the Big River Sand Company site. Between 1982 and 1984, the property owner conducted a cleanup ordered by the Kansas Department of Health and Environment (KDHE).

The Big River Sand Company site was proposed for the National Priorities List (NPL) in October 1984 and in May 1986 was placed on the NPL. The U.S. Environmental Protection Agency (EPA) initiated a Remedial Investigation (RI) in 1985 to determine the presence and extent of contamination remaining in soils, sediments, surface water and ground water and to determine the need for further remedial response actions to protect the public health and welfare and the environment.

Based on the site cleanup activities performed by the property owner, the RI conducted by EPA, a Health Consultation provided by the Agency for Toxic Substances and Disease Registry (ATSDR) and monitoring conducted in March 1988, the EPA has determined that the site does not pose a significant threat to public health and welfare and the environment. The EPA, in consultation with the State of Kansas, has therefore selected the "No Further Action" alternative as the final remedy for the site.

This Decision Summary provides a brief description of the site and an overview of the site-specific factors and analysis conducted which led to the remedy selection.

2.0 SITE NAME, LOCATION AND DESCRIPTION

The Big River Sand Company site is located in the south half of Section 2, Township 27 South, Range 1 West, in Sedgwick County, Kansas. The site is just northwest of the city limits of Wichita (Figure 2-1). The site is east of Hoover Road and north of 21st Street, approximately 1/2 mile west of the Arkansas River and adjacent to the Wichita Valley Center Floodway (Figure 2-2).

The site consists of approximately 123 acres, half of which has been extensively mined for sand and gravel. The site includes two property owners: Mr. Vic Eisenring and the Big River Sand Company. Mr. Eisenring, former owner of the entire site, currently owns the eastern portion of the site and the Big River Sand Company owns the western portion (Figure 2-3). Sand and gravel mining is still active on both properties. Located on the south portion of the site is the Big River Sand Company office and the Eisenring office and residence.

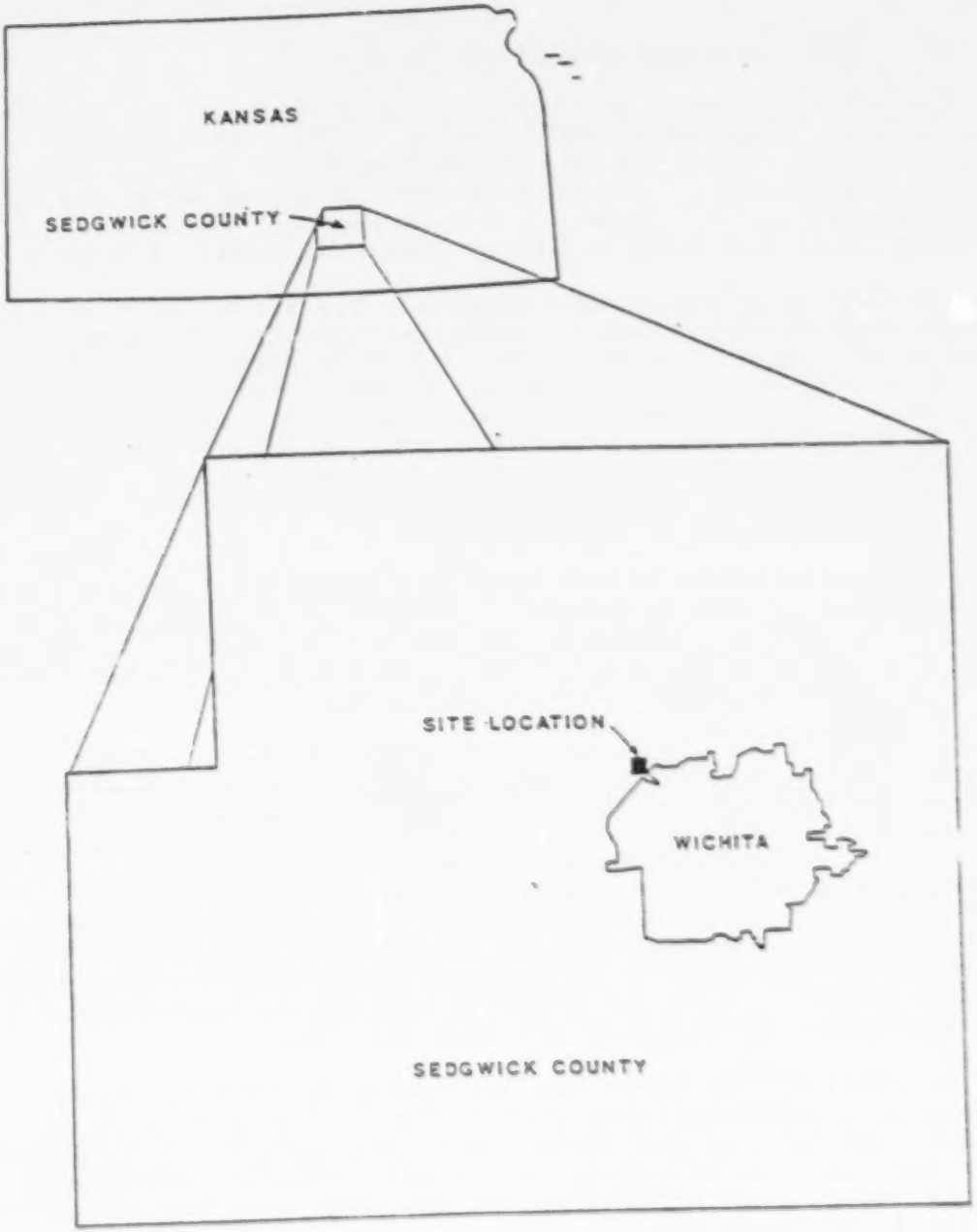
Land use adjacent to the site is a mixture of agricultural and residential. Approximately 25 residences are located west of the site and two residences are to the south. Land use to the north is predominantly agricultural. Adjacent to the site on the east is the floodway and the Arkansas River.

The site is located within the Arkansas Valley, which is characterized by extreme flatness and poorly developed surface drainage of the Arkansas River floodplain. Unconsolidated silt, sand and gravel deposits form an extensive ground water aquifer parallel to the Arkansas River Valley. At the site, the unconsolidated deposits are approximately 48 feet thick. The depth to ground water ranges from 7 to 14 feet below the ground surface. The regional and site ground water flow is in a southeasterly direction towards the Arkansas River. The velocity of ground water flow in the alluvial aquifer is very rapid, estimated to be about 1.9 to 3.4 feet per day.

The aquifer lies above the Wellington Formation, which consists of low-permeability shales with little potential for vertical flow through the shale unit. The Wellington Formation is not used as a water supply in the site vicinity because it produces water lower in quality and quantity than the overlying unconsolidated deposits.

There are approximately 30 domestic and/or livestock water wells within one-half mile of the site, three of which are on the site. The alluvial aquifer is the primary source of water for residences west of the Arkansas River and floodway. The City of Wichita supplies water for residences east of the river and floodway.

A large volume of ground water recharge occurs in the site vicinity by infiltration of precipitation, which is estimated at approximately 20 percent of the total precipitation. Normal annual precipitation is about 30 inches.



NOT TO SCALE

SITE LOCATION MAP

Figure 2-1

EXPLANATION

EXTENT OF THE BIG RIVER SAND COMPANY SUPERFUND SITE

TOPOGRAPHIC MAP OF THE BIG RIVER SAND COMPA SUPERFUND SITE VICINITY

NOTE 1. Contour interval is 5 feet.

2. Modified from U.S. Geological Survey, 1961, photorevised 1982.

Figure 2-2

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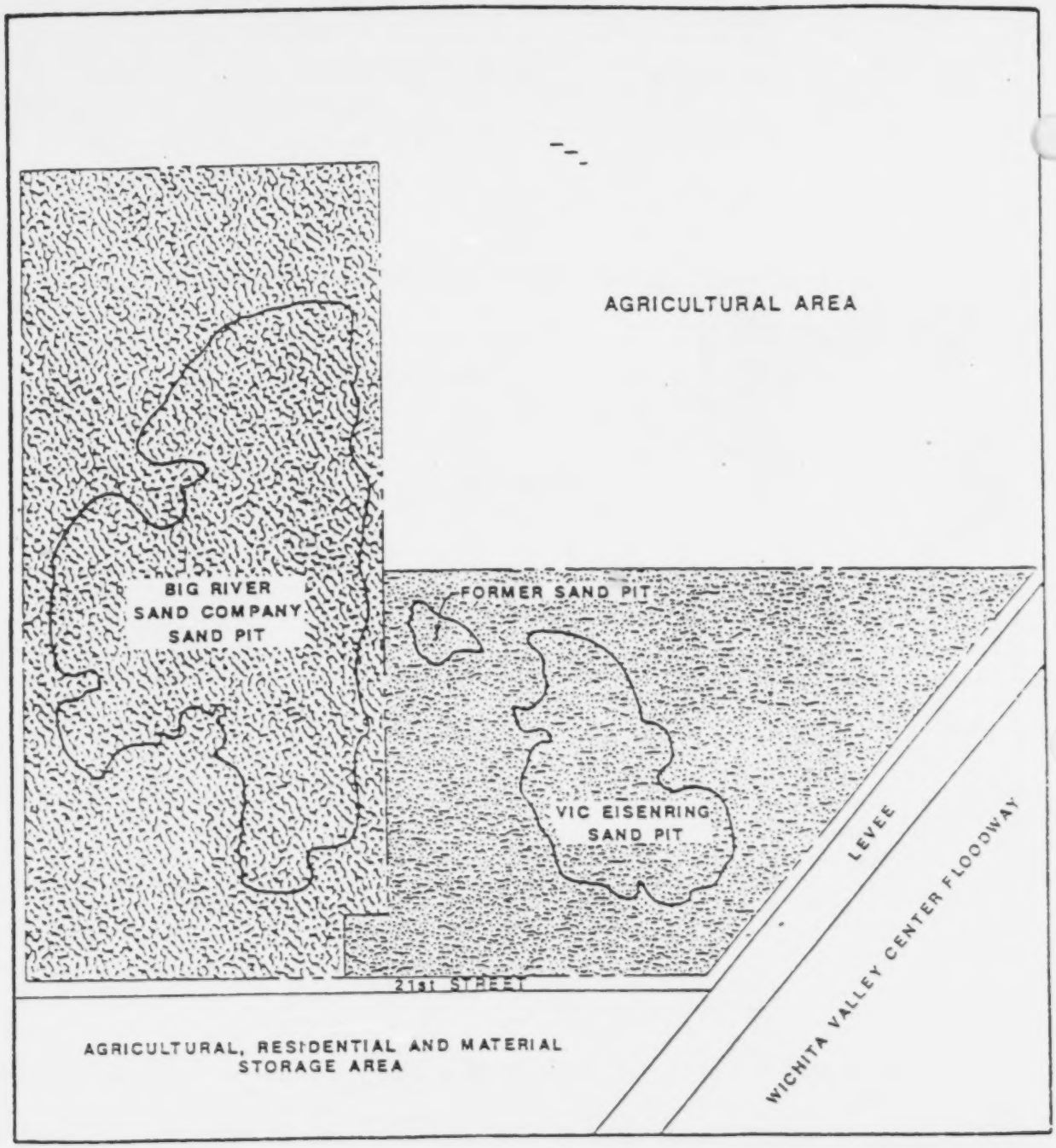


EXPLANATION

BIG RIVER SAND COMPANY PROPERTY

VIC EISENRING PROPERTY

— APPROXIMATE SITE BOUNDARY (FENCED)

0 500 1000

SCALE IN FEET

N

NOTE

Pit boundaries are based on aerial photography from May 1986.

SITE MAP FOR THE
BIG RIVER SAND COMPANY
SUPERFUND SITE

Figure 2-3

3.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

3.1 Summary of Pre-RI Activities

During the early 1970's, approximately 2,000 drums of paint-related wastes were disposed of on the Eisenring property, adjacent to a five-acre sand quarry lake. In 1978, Mr. Eisenring sold about 80 acres of his property which included the quarry lake and drum storage area, to the Big River Sand Company. As part of the sales agreement, Mr. Eisenring began to transfer the drums to his adjacent property in 1982. Nearly 200 barrels were transferred before the KDHE halted the action because Mr. Eisenring did not have a permit to store or dispose of the waste.

The KDHE conducted an initial site inspection in August 1982 and identified damaged, corroded and leaking drums. The KDHE sampled waste solvents and paint sludges from several drums and detected metals (including arsenic, cadmium, chromium, lead and selenium) and volatile organic compounds (VOCs, including toluene, ethylbenzene and trichloroethylene). Waste solvents from the barrels were determined to be hazardous waste due to the characteristic of ignitability. Paint sludges failed the EP Toxicity test for chromium.

In September 1982, KDHE issued an order to Mr. Eisenring to conduct a removal and site cleanup. From 1982 to 1984, the State provided oversight on the removal and site cleanup activities performed by Mr. Eisenring. Approximately 40 cubic yards of hazardous paint sludge was disposed of at the USPCI hazardous waste landfill in Oklahoma. About 10,000 gallons of solvent were recycled by Pratt and Lambert in Andover, Kansas. Non-hazardous material was disposed of at the Wichita Brooks Landfill.

Between 1982 and 1985, KDHE sampled soils, the quarry lake and residential drinking water wells. The State also installed and sampled onsite monitoring wells. Arsenic, lead and selenium were detected in drinking water wells at concentrations greater than Maximum Contaminant Levels (MCLs) established by the Safe Drinking Water Act. Concentrations of several metals detected in the onsite monitoring wells also exceeded MCLs. VOCs, including toluene, were detected in onsite soils and in monitoring wells.

The site was proposed for the NPL in October 1984 and in May 1986 was placed on the NPL.

3.2 Summary of RI Activities

A remedial investigation was conducted by EPA to determine the presence and extent of contamination remaining in soils, sediments, surface water and ground water and to determine the need for further remedial response actions to protect public health and welfare and the environment. Additional objectives of the investigation were to define the geology and hydrogeology of the site, determine the direction and rate of ground water flow, identify potential migration pathways and receptors, and to

identify general response actions and potential remedial technologies for the site.

The RI field activities were performed in 1986 and 1987 and consisted of two phases. The first phase included an initial site visit, a soil-gas survey, ambient air sampling and shallow-soil sampling. The second phase consisted of surface water and sediment sampling, subsurface soil sampling and ground water sampling of both onsite and nearby residential drinking water wells. Seven onsite monitoring wells were also installed and sampled during the second phase (Figure 3-1).

Both phases of the RI field activities focused on three areas: the former 2,000-drum disposal area at the northern end of the Big River Sand Company property; the former 200-drum disposal area on the eastern side of the Eisenring property; and the previous location of four solvent storage tanks used during the removal effort in the southeastern portion of the Eisenring property (Figure 3-2).

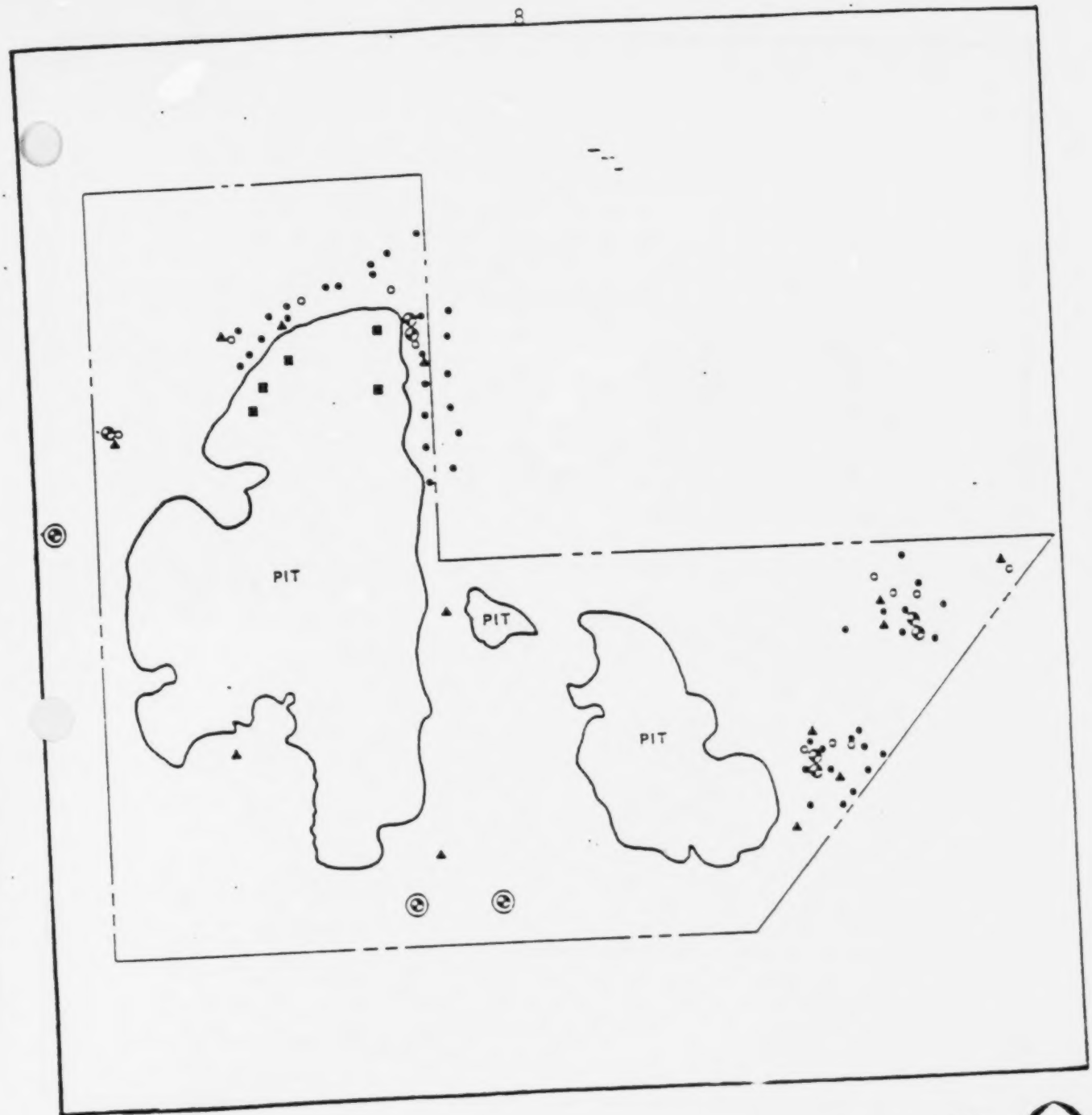
The initial site visit conducted in May 1986 confirmed that ongoing sand mining operations had removed most of the former 2,000-drum disposal area at the northern end of the Big River Sand Company property. The former 200-drum disposal area on the Eisenring property was in a natural vegetative state that included tall grass, scrub vegetation and small trees. Neither disposal area had signs of stressed vegetation or evidence of remaining drums. The site visit and information obtained from the Kansas Biological Survey did not identify any environmentally sensitive areas or threatened and endangered species in the vicinity.

The soil-gas survey, ambient air sampling and surficial soil sampling were conducted in February 1987. Forty-five vadose zone soil-gas samples were obtained during the soil-gas survey to determine the presence of volatile organic compound contamination in surficial soils and ground water. The sample results indicated significant volatile organic contamination was not present.

Ambient air samples for particulate matter were collected at 13 locations onsite and portable air monitoring equipment was used to test for organic vapors. The air sampling results indicated no health hazards were present.

Shallow-soil samples were collected at 12 locations and analyzed for metals, volatiles, semivolatiles and pesticides. The only significant contamination identified was for metals. Several soil samples had metal concentrations above the background sample (upgradient from any drum disposal areas). However, comparison of the concentrations to typical median values throughout the United States indicates onsite shallow soils are similar to median soil concentrations in the country.

The second phase of field activities was conducted in April and May 1987 and included the installation and sampling of seven



EXPLANATION

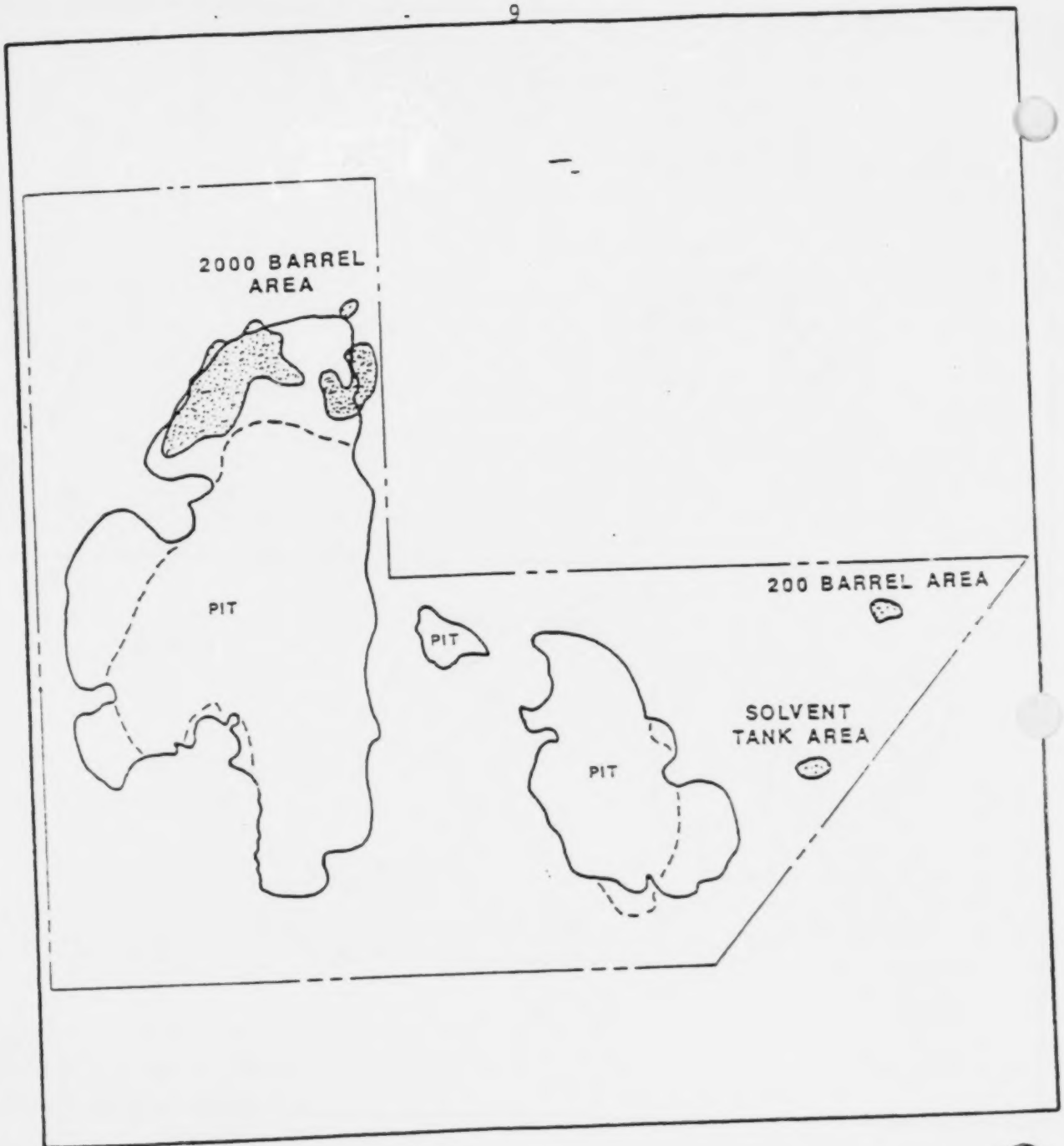
- VADOSE ZONE SOIL-GAS
- PIT SEDIMENT AND PIT WATER
- GROUNDWATER AND SUBSURFACE SOIL
- PRIVATE WELL
- AMBIENT AIR
- SHALLOW SOIL
- APPROXIMATE SITE BOUNDARY

0 500 1000
SCALE IN FEET

N

SAMPLING LOCATION MAP
FOR ALL MEDIA

Figure 3-1



EXPLANATION

APPROXIMATE FORMER LOCATIONS OF BARRELS AND TANKS BASED ON DECEMBER 1983 AERIAL PHOTOGRAPH INTERPRETATION

EXTENT OF SAND PITS IN DECEMBER 1983

EXTENT OF SAND PITS IN MAY 1986

APPROXIMATE SITE BOUNDARY (FENCED)

0 500 1000

SCALE IN FEET

N

FORMER LOCATIONS OF PIT BOUNDARIES AND WASTE-CONTAINING BARRELS AND TANKS

Figure 3-2

onsite monitoring wells, subsurface soil sampling, surface water and sediment sampling, and sampling of both onsite and offsite residential drinking water wells.

During installation of the onsite monitoring wells, 10 composite soil samples for the depth intervals 0 to 6 feet, 9 to 11 feet and 14 to 16 feet were collected and analyzed for metals and volatile organic compounds. As was the case for the shallow soil samples, the subsurface soil samples had metal concentrations above the background sample. Again, comparison of the concentrations to soils throughout the country indicates the subsurface soil samples are well within a typical range for metals.

Ground water samples were collected from the seven onsite monitoring wells and analyzed for total and dissolved metals and volatile organic compounds. Total and dissolved metals were detected in the ground water samples. Only one monitoring well, however, had a metal concentration which exceeded a primary drinking water standard established by the Safe Drinking Water Act. Selenium was detected at a concentration of 62 micrograms per liter (ug/l) in well E101S, exceeding the MCL of 10 ug/l. Selenium was not detected in any of the other monitoring wells.

Ground water samples were also collected from three residential drinking water wells. Two of the wells were located on the southern portion of the site and one well was northwest of the site. The samples were analyzed for total and dissolved metals and volatile organic compounds. No significant contamination was detected.

Five surface water samples and five sediment samples were taken from the quarry lake on the Big River Sand Company property. The samples were analyzed for total and dissolved metals and volatile organic compounds. No significant contamination was detected.

The geology and hydrogeology of the site was better defined by the installation of the monitoring wells. Geologic logs and water level measurements for the wells indicate that the shallow aquifer consists of a relatively homogeneous sandy material with rapid ground water flow (1.9 to 3.4 feet per day) in a southeasterly direction. The depth to ground water ranged from 7 to 14 feet below the ground surface.

In summary, the remedial investigation found metals in soil and ground water above background levels, but not outside the range of metals that may be found naturally occurring in soil and ground water. Selenium was detected at a concentration of 62 ug/l in well E101S, exceeding the MCL of 10 ug/l. Selenium was not detected in any other monitoring wells or in any of the private wells sampled. Table 3-1 provides a summary of media sampled and analyses performed. Tables 3-2 through 3-6 provide a summary of the highest contaminant concentrations detected before and during the RI.

At the request of EPA, the ATSDR provided a Health Consultation for the site in November 1987. The ATSDR concluded, based on the RI data and information, that the site does not currently appear to present a significant health threat. The ATSDR attributed this conclusion to the previous site mitigation activities, natural site flushing of contamination from the soils and rapid ground water transport.

During the initial phase of the RI, preliminary remedial alternatives were developed. General remedial response actions were identified for each suspected contaminated media at the site and potential remedial technologies were selected. A Feasibility Study to develop and evaluate in detail the remedial alternatives was not conducted, however, because the RI Report and ATSDR Health Consultation concluded that previous cleanup actions effectively eliminated any threats to the public health and welfare and the environment.

3.3 Summary of Post-RI Activities

The ATSDR Health Consultation also recommended that private wells downgradient of the site and monitoring wells onsite be sampled periodically for potential site-related contaminants to assure the protection of human health.

In response to ATSDR's recommendation, EPA sampled during Marc 1988 two residential drinking water wells onsite and three monitoring wells. Selenium was again detected in monitoring well E101S at a concentration of 56 ug/l.

The ATSDR reviewed the final RI Report and the March sampling data and again concluded that the site does not currently appear to present a significant health threat and recommended monitoring to assure protection of human health.

4.0 COMMUNITY RELATIONS

Community interest in the site was quite high during 1982 and 1983. The local newspaper, The Wichita Eagle-Beacon, presented several articles regarding the removal and site cleanup.

Community concern lessened after the removal was completed in 1984. No citizen inquiries were made to local, State or Federal officials. During development of EPA's Community Relations Plan for the RI, interviews were conducted with officials and residents of the Wichita area in October 1985. Several residents living near the site indicated that they were not concerned about the site and had no complaints regarding their drinking water wells. Onsite remedial investigation activities conducted in 1986 and 1987 also did not generate any citizen inquiries.

Section 117(a) of CERCLA provides that a notice and brief analysis of the Proposed Plan must be published, and that the Proposed Plan be made available to the public. For the Big River Sand Company site, a notice and brief analysis of the Proposed Plan was published on May 31, 1988, in the The Wichita Eagle-Beacon. The public notice provided a brief overview of the site and identified the lead agency (EPA) and the support agency (KDHE). The notice informed the public of its role in the decision-making process and provided information on the public comment period, the location of the information repositories and methods by which the public could submit oral and written comments. The notice also presented the preferred alternative and requested public comments on the alternative.

To provide the community with a reasonable opportunity to submit written and oral comments on the Proposed Plan and the RI Report, the EPA and KDHE established a public comment period from May 31 through June 20, 1988. The EPA and KDHE also invited requests for a public meeting in the community to present the Proposed Plan and RI report, answer questions and receive comments.

The Proposed Plan, RI report and Administrative Record file were made available for public review at the Sedgwick County Public Library, Main Branch, 223 S. Main Street, Wichita, Kansas, and at the EPA Region VII Library in Kansas City, Kansas.

At the beginning of the public comment period, EPA met with officials from several local government agencies. The officials were provided copies of the Proposed Plan and an overview of site issues.

No comments were received by EPA or the State on the Proposed Plan, the preferred alternative or the Administrative Record file during the public comment period.

5.0 SCOPE AND ROLE OF RESPONSE ACTION

The EPA, in consultation with the State, has determined that the Big River Sand Company site does not pose a significant threat to public health and welfare and the environment. The EPA, therefore, has selected the "No Further Action" alternative as the final remedy for the site.

Because this final remedy will result in a hazardous substance remaining onsite, a review as required by CERCLA will be conducted within five years to ensure that the final remedy continues to provide adequate protection of human health and the environment. This review will include an onsite sampling event. Ground water samples will be obtained from the upgradient monitoring well, monitoring well E101S and Eisenring's office and residence drinking water wells. The samples will be analyzed for metals and the data evaluated to ensure that the final remedy continues to provide adequate protection of human health and the environment.

6.0 SITE CHARACTERISTICS

Analysis of the RI data indicates that the primary type of contamination is metals and is largely confined to soils and ground water.

6.1 Shallow Soil

Summarized in Table 6-1 are the analytical results for shallow-soil samples collected from 12 locations. The sample from location SS-2 was used as a background sample for comparing sample results because it is upgradient of the site and in an area not formerly used to store wastes. This background sample consistently had the lowest metal concentrations.

A statistical analysis of the analytical data for total metal concentrations is presented in Table 6-2. The data have been normalized by dividing the sample concentration by the background sample concentration. The sample value is then presented as a ratio of the background value, setting the background value at one. The relative magnitude of the concentrations compared to background are more easily evaluated in this manner. Some of the differences between normalized concentrations can be attributed to natural soil composition variability, which can be different for each compound. A large variation in only one compound value has a significant effect on the mean value.

In summary, the shallow soil samples were elevated for some metal concentrations relative to the upgradient sample. The elevated concentrations are anticipated to be due to paint waste spillage at the site. However, comparison of these concentrations to typical median values for soils throughout the United States indicates onsite shallow soils are similar to median soil concentrations across the country.

6.2 Subsurface Soil

Table 6-3 is a summary of the analytical results for metals detected in the 11 split-spoon soil samples analyzed from the seven boreholes on the site. The composited sample (0 to 6-foot depth) from borehole B101S was used as a background sample for comparing the sample results because it is upgradient of the site and in an area not formerly used to store wastes. This background sample consistently had the lowest metal concentrations.

The concentrations for the 0 to 6-foot composited interval were normalized as described in Section 6.1 to the background sample concentration (Table 6-4).

In summary, the metal concentrations decrease with depth. This is apparently due to the adsorption of the metals onto the soil during vertical migration toward the ground water. In comparison to soils throughout the United States, the split-spoon soil samples are well within a typical range for metal compounds.

6.3 Ground Water

Tables 6-5 through 6-8 are summaries of the analytical results for total and dissolved metal concentrations in ground water. The sample from monitoring well B101S was used as a background sample for comparing the sample results because it is upgradient of the site and in an area not formerly used to store wastes. The concentrations at this background location were the lowest of all the monitoring well samples; however, the concentrations in the private well samples were generally lower than the concentrations in monitoring wells.

The ground water sample concentrations were normalized to the background sample concentration (Table 6-9) as previously described. The greatest variability occurred for selenium, zinc and magnesium. Metal concentrations did not vary significantly for each sample location; most of the variation may be attributed to natural variability in ground water composition.

In summary, only one monitoring well, E101S, had a metal concentration which exceeded a primary drinking water standard. Selenium was detected at a concentration of 62 ug/l, exceeding the MCL of 10 ug/l. Selenium was not detected in any of the other monitoring wells or drinking water wells. A U.S. Geological Survey report on ground water supplies in Kansas found thirteen percent of wells sampled exceeded the MCL for selenium. The survey statistics were based on sampling 766 wells between 1976 and 1981.

6.4 Mobility and Toxicity

Selenium and the other metals detected should be relatively immobile under the pH conditions present in the ground water at the site. The detection of higher metal concentrations in the shallow soil relative to the deeper soil samples indicates the metals are being attenuated during infiltration and percolation toward the ground water.

There is no evidence that selenium is carcinogenic in humans. Selenium has been tested by the oral route in experimental animals, but the available data are insufficient to allow unequivocal evaluation of its carcinogenic potential. However, recent reports suggest that selenium is not carcinogenic. Several studies have shown that selenium may actually reduce the incidence of tumors under certain conditions. Mutagenicity, teratogenicity and reproductive effects have not been adequately tested.

Selenium is an essential element in animals and probably in humans. However, exposure to amounts only slightly above the required levels can produce acute and chronic toxic effects. Acute toxicities of selenium compounds vary greatly, while the chronic effects of most forms are similar. Exposure may be of oral, inhalation or dermal routes; and effects in humans and experimental animals are similar. Acute effects include degeneration of liver, kidneys and myocardia, hemmorrhages in the digestive tract and brain damage. Eye, nose and throat irritation may also occur with inhalation exposure. Chronic toxicity in humans appears to occur only in areas where foods containing excessive concentrations of selenium are ingested. Signs of chronic intoxication include depression, nervousness, dermatitis, gastrointestinal disturbances, dental caries and discoloration, lassitude and partial loss of hair and nails.

6.5 Potential Pathways of Migration and Exposure

The RI identified ground water as the primary pathway of migration and consumption of drinking water from onsite wells as the principal route of exposure. Other potential routes of exposure include inhalation, ingestion and dermal contact with contaminated soils.

Due to the poorly developed surface drainage of the Arkansas River floodplains, there are no surface water drainages leaving the site; therefore, surface water is not considered a migration pathway.

7.0 SUMMARY OF SITE RISKS

A summary of the carcinogenic and non-carcinogenic risk estimates associated with the two major exposure scenarios is provided in Table 7-1. The measured concentrations of a few inorganic constituents were indicative of a potential for adverse health effects associated with consumption of ground water, but it is unclear if the presence of these constituents is related to previous site activity.

The risks posed to onsite workers by exposure to contaminated soils fall below the level of concern for non-carcinogenic effects, and are well within the range of acceptable risks for excess cancer risk. Populations farther downwind of the site might be exposed to airborne particulates, but the risk presented by this exposure would be negligible based on the RI ambient air sampling data.

Consumption of ground water may present some potential for adverse health effects. Local background water quality is poor; the water contains concentrations of sodium that are well in excess of the recommended level of 20 milligrams per liter (mg/l) for individuals on a sodium-restricted diet.

Lifetime consumption of drinking water from Vic Eisenring's domestic well may result in a moderately increased cancer risk due to the presence of arsenic. The cumulative effect of exposure to concentrations of copper and lead may also present a health hazard to children and adults. The concentrations of both lead and arsenic are below their respective MCLs, indicating that use of an alternative drinking water supply would not result in an appreciable reduction of risk. The concentration of copper is below the ambient water quality criteria of 1.0 mg/l, which is not health based; rather, it is based on taste and odor criteria. Although copper, arsenic and lead were not detected in the background well, B101S, the concentrations of arsenic and copper measured in the Eisenring well are within the normal range of these inorganics found naturally occurring in ground water.

Health effects associated with consumption of drinking water from well E101S were also evaluated as this well is downgradient of the former drum storage area and can be considered representative of a worst-case scenario. Water from this well contained the highest concentration of selenium observed, 62 ug/l, which exceeded the MCL of 10 ug/l. Daily ingestion of this water could present a potential health hazard to a small child.

The risk assessment from the RI summarized above is consistent with the findings of the ATSDR Health Consultation which concluded that the site does not currently appear to represent a significant health threat.

Samples of surface water from the Big River Sand Company sand pit did not contain detectable concentrations of any organics. The concentrations of inorganics found were consistent with those observed in natural waters. These results indicate that current site conditions do not present a threat to aquatic species that may be present in the sand pits.

The Kansas Biological Survey did not identify any environmentally sensitive areas or threatened and endangered species in the immediate vicinity.

8.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The EPA and KDHE presented the Proposed Plan to the community on May 31, 1988. The Proposed Plan identified the No-action alternative as the preferred alternative for the Big River Sand Company site remedy. There have been no significant changes made to the selected alternative since it was originally presented in the Proposed Plan.

9.0 THE SELECTED REMEDY

The "No Further Action" alternative has been selected as the final remedy for the Big River Sand Company site. The EPA, in consultation with the State, determined that the site does not pose a significant threat to public health and welfare and the environment; therefore, taking additional remedial measures is not appropriate. This determination is primarily based on: 1) Sampling and site cleanup activities conducted by the State between 1982 and 1985; 2) Remedial Investigation activities conducted by EPA in 1986 and 1987; 3) Health Consultation provided by the ATSDR; and 4) Monitoring conducted by EPA in March 1988. It is also recommended that procedures to delete the site from the NPL be initiated.

As will be discussed in detail in Section 10 of this document, the selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate and is cost-effective. Because this remedy will result in a hazardous substance remaining onsite, a review will be conducted as required by CERCLA 121(c) within five years to ensure that the remedy continues to provide adequate protection of human health and the environment.

The final remedy does not include monitoring as recommended by ATSDR in their Health Consultation. Monitoring is generally recommended as a precautionary measure to ensure protection of public health. The EPA and State do not believe monitoring is necessary as a precautionary measure for this site given the site-specific conditions which are present. Ground water sampling has demonstrated that no MCLs are being exceeded in onsite or offsite drinking water wells. No MCLs are being exceeded in any of the onsite monitoring wells with the exception of well E101S at the eastern edge of the site. Ground water flow is rapid and to the southeast. No drinking water wells are located downgradient of well E101S due to the presence of the Wichita Valley Center Floodway located adjacent to the site's eastern boundary. In addition, sampling conducted in May 1987 and March 1988 has demonstrated that there has been no migration of selenium from the area of well E101S. In both sampling events, selenium was not detected in monitoring wells immediately to the south or in onsite drinking water wells to the southwest.

10.0 STATUTORY DETERMINATIONS

Based on all the available information, the selected remedy satisfies the remedy selection requirements under CERCLA, as amended by SARA, and the National Contingency Plan. The remedy provides protection of public health and the environment, achieves all applicable or relevant and appropriate requirements and is cost-effective. The statutory requirement for utilization of permanent solutions and alternative treatment technologies to the maximum extent practicable and the statutory preference for treatment as a principal element were both determined to be impracticable because the site does not present a significant threat to public health and the environment and, therefore, treatment technologies are not necessary.

10.1 Protective of Human Health and the Environment

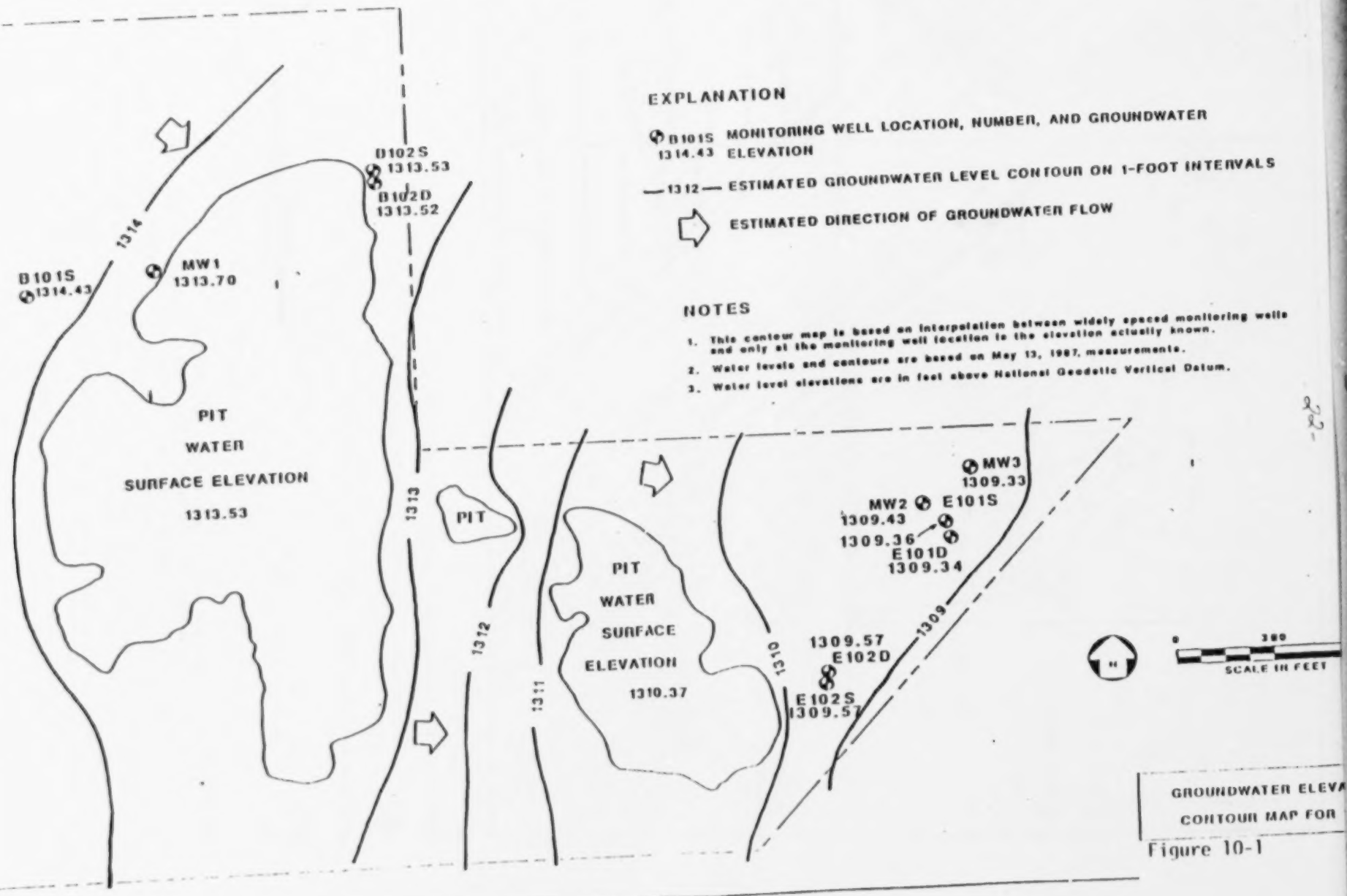
Both the RI risk assessment and ATSDR's Health Consultation concluded that the site does not currently pose a significant threat to human health or the environment. The remedial investigation detected metals in soil and ground water above background levels, but not outside the range that may be found naturally occurring in soil and ground water.

Ground water sampling has demonstrated that no MCLs are being exceeded in onsite or offsite drinking water wells. No MCLs are being exceeded in any of the onsite monitoring wells with the exception of well E101S at the eastern edge of the site. Ground water flow is rapid and to the southeast (Figure 10-1). No drinking water wells are located downgradient of well E101S due to the presence of the Wichita Valley Center Floodway located adjacent to the site's eastern boundary (Figure 10-2). In addition, sampling conducted in May 1987 and March 1988 has demonstrated that there has been no migration of selenium from the area of well E101S. In both sampling events, selenium was not detected in monitoring wells immediately to the south or in onsite drinking water wells to the southwest.

10.2 Attainment of Applicable or Relevant and Appropriate Requirements (ARARs)

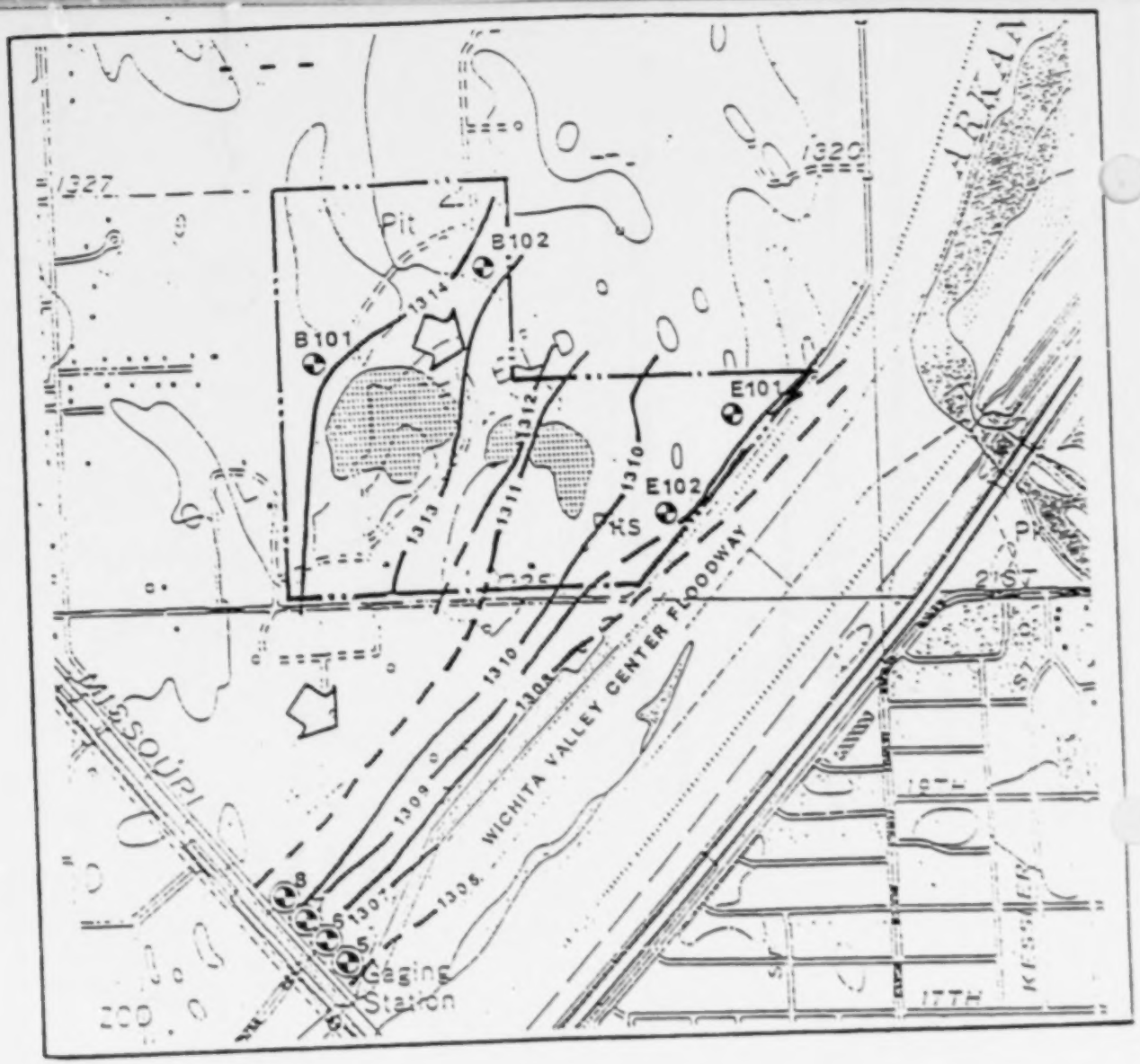
Section 121(d) of CERCLA, as amended by SARA, requires that remedial actions comply with applicable or relevant and appropriate requirements or standards (ARARs) under Federal and State environmental laws.

The Safe Drinking Water Act (SDWA) has been identified as a relevant and appropriate requirement. The SDWA established primary drinking water standards, MCLs, which protect human health from the potential adverse effects of drinking water contaminants. MCLs are generally relevant and appropriate where th ground water is or may be used for drinking water. However, MCLs may not be appropriate for site-specific circumstances where a


EXPLANATION
B101S 1314.43 MONITORING WELL LOCATION, NUMBER, AND GROUNDWATER ELEVATION
1312 ESTIMATED GROUNDWATER LEVEL CONTOUR ON 1-FOOT INTERVALS
ESTIMATED DIRECTION OF GROUNDWATER FLOW
NOTES
1. This contour map is based on interpolation between widely spaced monitoring wells and only at the monitoring well location is the elevation actually known.
2. Water levels and contours are based on May 13, 1987, measurements.
3. Water level elevations are in feet above National Geodetic Vertical Datum.
B102S 1313.53
B102D 1313.52
B101S 1314.43
MW1 1313.70
1314
PIT WATER SURFACE ELEVATION 1313.53
1313
PIT
1312
1311
PIT WATER SURFACE ELEVATION 1310.37
1310
1309
MW3 1309.33
MW2 1309.43
E101S 1309.36
E101D 1309.34
1309.57 E102D
E102S 1309.57
0 200
SCALE IN FEET

GROUNDWATER ELEVA
CONTOUR MAP FOR

Figure 10-1



EXPLANATION

- B101 — MONITORING WELL LOCATION AND NUMBER
- 8 — APPROXIMATE LOCATION OF CITY MONITORING WELL AND WELL NUMBER
- —1312— GROUNDWATER LEVEL CONTOUR ON 1-FOOT INTERVALS
- ESTIMATED DIRECTION OF GROUNDWATER FLOW

0 1000 2000
SCALE IN FEET

N

NOTES
1. This contour map is based on interpolation between widely spaced monitoring wells and only at the monitoring well location is the elevation actually known.
2. Water level contours based on May 13, 1987, measurements.
3. Water level elevations are in feet above National Geodetic Vertical Datum.
4. Modified from U.S. Geological Survey 1961, photorevised 1982.

GROUNDWATER ELEVATION CONTOUR MAP FOR SITE AND VICINITY

Figure 10-2

Reproduced from best available copy.

well would never be placed and ground water would therefore never be consumed; for example, a small strip of land between the toe of a landfill and a river. Site-specific factors need to be considered in determining whether a requirement is relevant and appropriate.

Maximum Contaminant Level Goals (MCLGs) are also established by the SDWA. MCLGs are strictly health-based, whereas MCLs take into consideration cost or feasibility.

For the Big River Sand Company site, MCLs are relevant and appropriate at onsite and offsite drinking water wells. MCLs are also relevant and appropriate for the aquifer located to the north, west and south of the site where the ground water may be used as a source of drinking water in the future. Both the RI ground water sampling conducted in May 1987 and ground water monitoring conducted in March 1988 demonstrated that no MCLs are being exceeded in onsite or offsite drinking water wells.

The MCLs are not relevant and appropriate, however, for well E101S where the MCL for selenium was exceeded. This determination is based on: 1) The character and circumstances of the exceedance compared to what the MCL requirement was intended to address; 2) The physical characteristics of the site and contamination; and 3) The threat to human health and the environment posed by the exceedance.

As previously discussed, MCLs are relevant and appropriate where the ground water is or may be used for drinking water. There are no drinking water wells in the immediate vicinity of E101S. Ground water flow is rapid and to the southeast. No private wells are located downgradient of E101S, nor will wells be placed downgradient since the Wichita Valley Center Floodway is located immediately to the east/southeast of the site.

The physical characteristics of the site and contamination also make the MCL inappropriate. As stated above, the ground water flow is to the southeast, opposite from wells used for drinking water. The large volume of ground water recharge at the site from infiltration of precipitation (estimated at 20 percent) through predominantly sandy soils, with rapid ground water flow, enhances the natural flushing. Monitoring conducted in March 1988 demonstrated natural attenuation; the concentration of selenium in well E101S decreased from 62 ug/l in May 1987 to 56 ug/l in March 1988.

Finally, there are no receptors of contamination from or downgradient of well E101S and, therefore, no present or future threat to human health and the environment exists.

Also in November 1985, the EPA proposed under the SDWA a MCLG for selenium of 45 ug/l, well above the current MCL of 10 ug/l.

10.3 Cost-effectiveness

There are no costs directly related to the selected remedy. Because the selected remedy will result in a hazardous substance remaining onsite above health-based levels, a review will be conducted as required by CERCLA 121(c), within five years to ensure that the remedy continues to provide adequate protection of human health and the environment.

The five-year review will include a sampling event. It is estimated (Table 10-1) that the current cost to obtain and analyze ground water samples from five wells onsite (three monitoring wells and two drinking water wells) is approximately $3,600. The future cost for sampling, if conducted in year five, is $5,800.

The "No Further Action" remedy, including costs associated with the five-year review requirement, is cost-effective.

10.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

The selected remedy does not satisfy the statutory preference for alternative treatment technologies because they were determined to be impracticable. Since contamination of the site does not pose a significant threat to public health and the environment, alternative treatment technologies are not necessary.

10.5 Preference for Treatment as a Principal Element

The selected remedy does not satisfy the statutory preference for treatment because treatment was found to be impracticable. The concentrations of contaminants detected in soil and ground water do not pose a significant threat to public health and the environment; therefore, no treatment is necessary.

Table 3-1

TABLE OF MEDIA SAMPLED AND TYPES OF ANALYSES

BIG RIVER SAND COMPANY SUPERFUND SITE

Media Sampled	Number of Sampling Locations	Analyses Performed
Ambient air	10	Particulate matter
Shallow soil	12	Total metals Volatile organic compounds Base/neutral organic compounds Acid extractable organic compounds Pesticides/PCBs Library search compounds
Split-spooned soil	4	Total metals Volatile organic compounds Library search compounds
Pit-bottom sediment	5	Total metals Volatile organic compounds Library search compounds
Vadose zone soil-gas	45	Chloroform Methylene chloride 1,1,1-Trichloroethane (TCA) Trichloroethene (TCE) Benzene Toluene Ethylbenzene Xylenes Total hydrocarbons
Groundwater and Surface Water		Total metals Dissolved metals Volatile organic compounds Library search compounds
Shallow monitoring wells	4	
Deep monitoring wells	3	
Private wells	3	
Pit water	5	

Table 3-2

COMPARISON OF WATER QUALITY STANDARDS TO TOTAL METAL COMPOUND CONCENTRATIONS FOR GROUNDWATER SAMPLES

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	MCL/KAL Concentration (mg/L)	Background Concentration (mg/L)	RI Data		Pre-RI Data	
			Highest Concentration (mg/L)	Highest Concentration Sample Location	Highest Concentration (mg/L)	Highest Concentration Sample Location
Arsenic (PP)	0.050	<0.010	0.015	B102S	0.101	200-barrel area
Barium	1.000	0.550	0.55	B101S	14.0	Solvent tank area
Cadmium (PP)	0.010	<0.005	<0.005	--	0.016	200-barrel area
Calcium	N/A	81.0	210.0	B102S	126.5	Private well
Chromium (PP)	0.050	0.018	0.034	B102D	0.58	2,000-barrel area
Copper (PP)	1.000	<0.025	<0.025	--	0.98	2,000-barrel area
Iron	0.300	4.20	19.0	E102S	428	2,000-barrel area
Lead (PP)	0.050	0.005	0.010	E101D/E102S	1.2	2,000-barrel area
Magnesium	N/A	7.70	24.0	E101S	23.85	Private well
Manganese	0.050	0.20	0.560	E102S	16	2,000-barrel are
Potassium	N/A	2.60	4.30	B102D	25	2,000-barrel area
Selenium (PP)	0.010	<0.005	0.062*	E101S	0.023	2,000-barrel area
Silver	0.050	<0.010	<0.010	--	0.03	2,000-barrel area
Sodium	N/A	120.0	190.0	B102D	186.9	2,000-barrel area
Zinc (PP)	5.000	<0.020	0.066	E102S	2.2	2,000-barrel area

(PP) = Priority Pollutant.
* = Compounds exceeding Federal Maximum Contaminant Level (MCL).
N/A = Not Available.
Notes: 1. Table includes only compounds above the detection limits.
2. Background sample concentrations from Monitoring Well B101S.
3. Groundwater monitoring well numbers have a "B" or "E" prefix, followed by a number and an "S" (shallow well) or "D" (deep well).

Table 3-3

HIGHEST ORGANIC COMPOUND CONCENTRATIONS
FOR GROUNDWATER AND SURFACE WATER SAMPLES

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	RI Data		Pre-RI Data	
	Highest Concentration (mg/L)	Highest Concentration Sample Location	Highest Concentration (mg/L)	Highest Concentration Sample Location
Volatile Organics				
Bromodichloromethane (PP)	0.007	Drill tank water	0.0096	City of Wichita Water Supply
Methylene chloride (PP)	0.011	Bailer blank	0.122	200-barrel area
Acetone	0.019	Laboratory blank	N/A	--
Dibromochloromethane (PP)	<0.005	--	0.0064	City of Wichita Water Supply
Bromoform (PP)	<0.005	--	0.0011	City of Wichita Water Supply
Trichloromethane	N/A	--	0.0126	City of Wichita Water Supply
1,1-Dichloroethylene (PP) (off-site)	<0.005	--	0.0035	Wright Livestock Well
1,1-Dichloroethane (PP) (off-site)	N/A	--	0.0028	Wright Livestock Well
1,1,1-Trichloroethane (PP) (off-site)	<0.005	--	0.0344	Wright Livestock Well
o,p-Xylenes	<0.005(a)	--	0.0041	2,000-barrel area
Base/Neutral Extractables				
Bis(2-ethylhexyl) phthalate (PP)	N/A	--	0.0571	2,000-barrel area
Di-n-octyl phthalate (PP)	N/A	--	0.0693	2,000-barrel area
Butyl benzyl phthalate (PP)	N/A	--	0.0315	Solvent tank area

N/A = Not Analyzed.
(PP) = Priority Pollutant.
(a) = Total Xylenes.
Notes: 1. Table includes only compounds above the detection limits.
2. Only water blanks and drill tank water samples were above the detection limit for the RI data.
3. Only three organic compounds were detected during the RI.
4. Holding time for samples from test holes were exceeded for the KDHE investigation.

Table 3-4

COMPARISON OF BACKGROUND AND
HIGHEST TOTAL-METAL CONCENTRATIONS
FOR SHALLOW SOIL SAMPLES

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	Range of Background Concentration (mg/kg)	Highest Measured Concentration (mg/kg)	Highest Concentration Sample Location
Aluminum	2,000 - 2,900	10,000	SS-11
Barium	29.0* - 43.0*	170	SS-11
Calcium	680* - 940*	23,000	SS-11
Chromium (PP)	<5.40 - <5.50	12.0	SS-5
Copper (PP)	<14.0	28.0	SS-4
Iron	4,100 - 4,600	14,000	SS-11
Lead (PP)	2.90 - 3.30	20.0	SS-9
Magnesium	520* - 740*	4,100	SS-11
Manganese	35.0 - 54.0	270	SS-11
Potassium	330* - 490*	1,800	SS-11
Tin	<22.0	26.0	SS-4
Zinc (PP)	5.30* - 9.30*	110	SS-5

(PP) = Priority Pollutant

* = Actual concentration, but less than CLP contract required detection limits.

Notes:
1. Samples are a composite by location of the 0- to 1-foot depth.
2. Background concentrations are from the two samples collected at location SS-2.
3. Shallow soil samples are labeled with "SS" suffix.
4. Inorganic analysis was not performed for KDHE investigation soil samples.

Table 3-5
COMPARISON OF BACKGROUND AND
HIGHEST TOTAL-METAL CONCENTRATIONS
FOR SPLIT-SPOONED SOIL AND PIT SEDIMENT SAMPLES

BIG RIVER SAND COMPANY ~~SUPERFUND~~ SITE

Compound	Background Concentration (mg/kg)	Highest Concentration (mg/kg)	Highest Concentration Sample Location	Highest Concentration Depth Interval (ft)
Aluminum	590	8,300	E101D	0-6
Barium	18*	190	E101D	0-6
Calcium	420*	20,000	E101D	0-6
Chromium (PP)	<5.1	11.0	E101D	0-6
Iron	2,000	15,000	E101D	0-6
Lead (PP)	<2.60	12.0	PP#3	23.5-24.5
Magnesium	300*	4,800	E101D	0-6
Manganese	64.0	430	E101D	0-6
Mercury (PP)	<0.1	0.53	PP#3	23.5-24.5
Tin	<20	48.0	E102S	9-11
Zinc (PP)	5.0*	49.0	E101D	0-6

(PP) = Priority Pollutant

* = Actual concentration, but less than CLP contract required detection limits.

Notes:
1. Table includes only compounds above the detection limits.
2. Background sample concentrations from monitoring well B101S, a composite of the 0- to 6-foot depth interval.
3. Sand pit sample numbers have the prefix "PP"; groundwater monitor well split-spooned soil sample locations have a "B" or "E" prefix, followed by a number and an "S" (shallow well) or "D" (deep well) suffix.
4. Inorganic analysis was not performed for KDHE investigation soil samples.

Table 3-6

HIGHEST ORGANIC COMPOUND CONCENTRATIONS
FOR SHALLOW SOIL, SPLIT-SPOONED* SOIL, AND PIT SEDIMENT SAMPLES

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	RI Data		Pre-RI Data	
	Highest Concentration (ug/kg)	Highest Concentration Sample Location	Highest Concentration (ug/kg)	Highest Concentration Sample Location
Volatile and Semi-Volatile Organics				
Vinyl acetate	14.0	PP #4	N/A	--
Carbon disulfide	15.0	SS-2	N/A	--
Bis(2-ethylhexyl) phthalate (PP)	2,200	SS-5	<372	--
Acetone	82.0	SS-11	N/A	--
Toluene (PP)	<6.00	--	118,000	200-barrel area
Ethylbenzene (PP)	<6.00	--	55,000	200-barrel area
m-Xylene	<6.00(a)	--	359,000	200-barrel area
o,p-Xylene	<6.00(a)	--	441,000	200-barrel area
Trichloroethylene (PP)	<6.00	--	30	200-barrel area
Benzene (PP)	<6.00	--	17	200-barrel area
Butyl benzyl phthalate (PP)	<410	--	850	200-barrel area
Pesticides/PCBs				
Aroclor-1260 (PP)	290	SS-8	N/A	--

(P) = Priority Pollutant.
(a) = Total xylenes.
N/A = Not Analyzed.
* = No organics were detected in the split-spooned soil samples during the RI.
Notes: 1. Table includes only compounds above the detection limits.
2. Sand pit samples have the prefix "PP"; shallow soil samples "SS".
3. Split-spooned soil sample concentrations were less than other soil sample concentrations.

Tab. 6-1

TABLE OF TOTAL METAL CONCENTRATIONS IN SHALLOW SOIL SAMPLES

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	Concentrations (mg/kg) Sample Number						
	SS-1	SS-2	SS-2 Duplicate	SS-3	SS-4	SS-5	SS-6
Aluminum	7,500	2,900	2,000	8,000	9,900	2,900	3,900
Barium	94.0*	43.0*	29.0*	150	98.0*	66.0*	52.0*
Calcium	2,500*	940*	680*	15,000	2,200*	770*	1,100*
Chromium (PP)	8.00	‹5.50	‹5.40	6.9	8.60	12.0	‹6.00
Copper (PP)	‹16.0	‹14.0	‹14.0	‹15.0	28.0	‹14.0	‹15.0
Iron	10,000	4,600	4,100	12,000	12,000	4,600	6,800
Lead (PP)	9.9	3.30	2.90	6.9	6.80	18.0	3.50
Magnesium	2,400*	740*	520*	3,300	2,200*	640*	910*
Manganese	200	54.0	35.0	200	130	68.0	74.0
Potassium	1,600*	490*	330*	760*	1700*	460*	530*
Tin	‹25.0	‹22.0	‹22.0	‹23.0	26.0	‹22.0	‹24.0
Zinc (PP)	30.0	9.30*	5.30*	33	30.0	110	8.90*

* Actual concentration, but less than CLP contract required detection limits.

(PP) = Priority Pollutant

Notes: 1. Samples are a composite of the 0- to 1-foot depth by location.
2. SS-2 is the background sample location.

Table 6-1 (Cont.)

TABLE OF TOTAL METAL CONCENTRATIONS IN SHALLOW SOIL SAMPLES

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	Concentrations (mg/kg) Sample Number SS-7	SS-8	SS-9	SS-10	SS-11	SS-12
Aluminum	4,600	1,900	4,600	8,800	10,000	8,300
Barium	70.0*	29.0*	56.0*	82.0*	170	110*
Calcium	1,700*	760*	1,200*	1,900*	23,000	13,000
Chromium (PP)	<6.00	<5.50	10.0	6.40	9.00	6.30
Copper	<15.0	<14.0	<14.0	<15.0	<15.0	<15.0
Iron	6,800	3,600	6,700	10,000	14,000	11,000
Lead (PP)	5.80	6.60	20.0	6.40	9.60	6.90
Magnesium	1,200*	550*	1,100*	2,000*	4,100	2,700*
Manganese	140	71.0	150	65.0	270	180
Potassium	810*	390*	1,000	1,500*	1,800*	1,500*
Tin	<24.0	<22.0	<23.0	<26.0	<32.0	<27.0
Zinc (PP)	16.0	8.90*	19	24.0	40	31

* Actual concentration, but less than CLP contract required detection limits.

(PP) = Priority Pollutant

Notes: 1. Samples are a composite of the 0- to 1-foot depth by location.
2. SS-2 is the background sample location.

Table 2

COMPARISON OF NORMALIZED SHALLOW SOIL SAMPLE CONCENTRATIONS

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	Normalized Concentration Sample Number											
	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9	SS-10	SS-11	SS-12
Aluminum	3.06	1.00	3.27	4.04	1.18	1.59	1.88	0.78	1.88	3.59	4.08	3.39
Barium	2.61	1.00	4.17	2.27	1.83	1.44	1.94	0.81	1.56	2.28	4.72	3.06
Calcium	3.09	1.00	18.52	2.72	0.95	1.36	2.10	0.94	1.48	2.35	28.40	16.05
Chromium (PP)	1.47	1.00	1.27	1.58	2.20	1.10	1.10	1.01	1.83	1.17	1.65	1.16
Copper (PP)	1.14	1.00	1.07	2.00	1.00	1.07	1.07	1.00	1.00	1.07	1.07	1.07
Iron	2.30	1.00	2.76	2.76	1.06	1.56	1.56	0.83	1.54	2.30	3.22	2.53
Lead (PP)	3.19	1.00	2.23	2.19	5.81	1.13	1.87	2.13	6.45	2.06	3.00	2.23
Magnesium	3.81	1.00	5.24	3.49	1.02	1.44	1.90	0.87	1.75	3.17	6.51	4.29
Manganese	4.49	1.00	4.49	2.92	1.53	1.66	3.15	1.60	3.37	1.46	6.07	4.04
Potassium	3.90	1.00	1.85	4.15	1.12	1.29	1.98	0.95	2.44	3.66	4.39	3.66
Tin	1.14	1.00	1.05	1.18	1.00	1.09	1.09	1.00	1.05	1.18	1.45	1.23
Zinc (PP)	4.11	1.00	4.52	4.11	15.07	1.22	2.19	1.22	2.60	3.29	5.48	4.25
Sum:	34.31	12.00	50.42	33.86	33.77	15.97	21.84	13.12	26.95	27.59	70.04	46.94
Mean:	2.86	1.00	4.20	2.82	2.81	1.33	1.82	1.09	2.25	2.30	5.84	3.91

PP = Priority pollutant.

Notes: (1) Background sample concentration is the average of two samples collected at SS-2.
(2) Sample is a composite of the 0- to 1-foot depth.

Table 6-3
TABLE OF TOTAL METAL CONCENTRATIONS IN
SPLIT-SPOONED SOIL SAMPLES

BIG RIVER SAND COMPANY SUPERFUND SITE

	Concentration (mg/kg) Sample Number and Sample Depth					
Compound	B101S 0-6 feet	B102D 0-6 feet	B102D Duplicate 0-6 feet	B102D 9-11 feet	B102D 14-16 feet	E101D 0-6 feet
Aluminum	590	6,100	4,800	4,200	570	8,300
Barium	18.0*	100*	91.0*	110*	16.0*	190
Calcium	420*	3,300	3,100	17,000	1,100*	20,000
Chromium (PP)	<5.1	6.80	6.6	6.80	<6.00	11.0
Iron	2,000	9,300	7,900	8,800	2,100	15,000
Lead (PP)	<2.60	8.70	7.6	6.6	3.3	6.1
Magnesium	300*	2,100*	1,500*	2,200*	350*	4,800
Manganese	64.0	290	250	150	44.0	430
Mercury (PP)	<0.1	<0.12	<0.12	<0.12	<0.12	<0.13
Tin	<20	<23.0	<23.0	<24.0	<24.0	<25.0
Zinc (PP)	5.0*	24.0	20.0	25.0	6.80*	49.0

* = Actual concentration, but less than CLP contract quired detection limits.

(PP) = Priority Pollutant.

Note: B101S is the background sample location.

Table 6-3 (Cont.)
TABLE OF TOTAL METAL CONCENTRATIONS IN SPLIT-SPOONED SOIL SAMPLES

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	Concentration (mg/kg) Sample Number and Sample Depth				
	E101D 9-11 feet	E101D 14-16 feet	E102S 0-6 feet	E102S 9-11 feet	E102S 14-16 feet
Aluminum	6,900	460	6,700	880	2,200
Barium	88.0*	8.60*	130	27.0*	70.0*
Calcium	3,200	540*	17,000	1,900*	8,200
Chromium (PP)	6.60	<5.50	7.90	3.20*	5.30*
Iron	10,000	880	11,000	3,200	5,400
Lead (PP)	11.0	2.90	8.70	5.50	4.60
Magnesium	2,300*	330*	2,700*	420*	1,200*
Manganese	86.0	13.0	270	54.0	84.0
Mercury (PP)	<0.12	<0.11	<0.12	<0.11	<0.14
Tin	<23.0	<22.0	<23.0	48.0	<27.0
Zinc (PP)	26.0	5.20*	32.0	8.80*	17.0

* = Actual concentration, but less than CLP contract required detection limits.

(PP) = Prioirty Pollutant.

Note: Table includes only samples and compounds measured above the detection limit.

Table 6-4

COMPARISON OF NORMALIZED SPLIT-SPOONED SOIL CONCENTRATIONS

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	Normalized Concentration Sample Number			
	B101S	B102D	E101D	E102S
Aluminum	1.00	10.34	14.07	11.36
Barium	1.00	5.56	10.56	7.22
Calcium	1.00	7.86	47.62	40.48
Chromium (PP)	1.00	1.33	2.16	1.55
Iron	1.00	4.65	7.50	5.50
Lead (PP)	1.00	3.35	2.35	3.35
Magnesium	1.00	7.00	16.00	9.00
Manganese	1.00	4.53	6.72	4.22
Mercury (PP)	1.00	‹1.20	‹1.30	‹1.20
Tin	1.00	‹1.15	‹1.25	‹1.15
Zinc (PP)	1.00	4.80	9.80	6.40
Sum:	11.0	‹51.77	‹119.33	‹91.43
Mean:	1.00	‹4.71	‹10.85	‹8.31

(PP) = Priorit, pollutant.

(‹) Symbol used to denote compound was reported at actual concentration of minimum detection limit and was below this limit.

Notes: (1) B101s was used as the background sample.
(2) Sample is a composite of the 0 to 6-foot depth.

Table 6-5

TABLE OF TOTAL METAL CONCENTRATIONS IN GROUNDWATER SAMPLES FROM MONITORING WELLS

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	Concentration (ug/L) Sample Number							
	B101S	B102S	B102D	E101S	E101S (Duplicate)	E101D	E102S	E102D
Arsenic (PP)	‹10	15	‹10	‹10	‹10	‹10	‹10	‹10
Barium	550	330	220	110*	110*	110*	440	110*
Calcium	81,000	210,000	89,000	130,000	130,000	120,000	97,000	77,000
Chromium (PP)	18	31	34	24	24	25	30	27
Iron	4,200	7,400	6,300	5,700	5,900	7,000	19,000	4,500
Lead (PP)	‹5.0	‹5.0	‹5.0	5.0	5.0	10	10	‹5.0
Magnesium	7,700	22,000	16,000	24,000	24,000	20,000	14,000	13,000
Manganese	200	210	160	140	140	170	290	46
Potassium	2,600*	3,300*	4,300*	3,100*	3,100*	4,100*	4,000*	4,000*
Selenium (PP)	‹5.0	‹5.0	‹5.0	61	62	‹5.0	‹5.0	‹5.0
Sodium	120,000	80,000	190,000	74,000	73,000	110,000	41,000	160,000
Zinc (PP)	‹20.0	‹42	‹34	‹31	‹32	‹54	66	‹36

* = Actual concentration, but less than CLP contract required detection limits.

(PP) = Priority Pollutant.

Table 6-6

TABLE OF DISSOLVED METAL CONCENTRATIONS IN GROUNDWATER SAMPLES FROM MONITORING WELLS

BIG RIVER SAND COMPANY SUPERFUND SITE

	Concentration (ug/L) Sample Number							
Compound	B101S	B102S	B102D	E101S	E101S (Duplicate)	E101D	E102S	E102D
Arsenic (PP)	<10.0	14	<10	<10	<10	<10	<10	<10
Larium	550	330	110*	220	110*	110*	330	110*
Calcium	79,000	210,000	91,000	120,000	130,000	120,000	97,000	77,000
Chromium (PP)	14	27	14	15	26	15	28	24
Iron	6,000	4,400	3,100	220.	3,400	2,700	14,000	3,200
Lead (PP)	<5.0	<5.0	<5.0	5.0	<5.0	<5.0	7.0	<5.0
Magnesium	7,900	21,000	15,000	23,000	24,000	19,000	14,000	13,000
Manganese	290	160	130	45	96	140	230	<33.0
Selenium (PP)	<5.0	<5.0	<5.0	61	57	<5.0	<5.0	<5.0
Sodium	110,000	82,000	190,000	73,000	73,000	110,000	38,000	150,000
Tin	<40.0	<400	<400	<400	<400	<400	<40	<40
Zinc (PP)	<25	<30	<47	<32	<52	<54	71	<48

* = Actual concentration, but less than CLP contract required detection limits.

(PP) = Priority Pollutant.

Table 6-7

TABLE OF TOTAL METAL CONCENTRATIONS IN PRIVATE WELL GROUNDWATER SAMPLES

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	Concentration (ug/L) Sample Number		
	PW#1	PW#2	PW#3
Barium	220	<200	110*
Calcium	76,000	71,000	84,000
Chromium (PP)	<10	<10	11
Magnesium	8,500	10,000	10,000
Manganese	<15	560	<15
Sodium	150,000	160,000	190,000

* = Actual concentration, but less than CLP contract required detection limits.

(PP) = Priority Pollutant.

Table 6-8

TABLE OF DISSOLVED METAL CONCENTRATIONS DETECTED IN PRIVATE WELL GROUNDWATER SAMPLES

BIG RIVER SAND COMPANY SUPERFUND SITE

	Concentration (ug/L) Sample Number		
Compound	PW#1	PW#2	PW#3
Barium	330	<200	220
Calcium	76,000	73,000	86,000
Magnesium	8,600	10,000	10,000
Manganese	<15	560	<15
Sodium	150,000	160,000	190,000

* = Actual concentration, but less than CLP contract required detection limits.

Table 6-9

COMPARISON OF NORMALIZED GROUNDWATER SAMPLE CONCENTRATIONS

BIG RIVER SAND COMPANY SUPERFUND SITE

Compound	Normalized Concentration Sample Number									
	B101S	B102S	B102D	E101S	E101D	E102S	E102D	PW#1	PW#2	PW#3
Arsenic (PP)	1.00	1.50	<1.00	<1.00	<1.00	<1.00	<1.00	1.00	1.00	1.00
Barium	1.00	0.60	0.40	0.20	0.20	0.80	<0.20	0.40	0.36	0.2
Calcium	1.00	2.59	1.10	1.60	1.48	1.20	0.95	0.94	0.88	1.04
Chromium (PP)	1.00	1.72	1.89	1.33	1.39	1.67	1.50	0.56	0.56	0.61
Iron	1.00	1.76	1.50	1.36	1.67	4.52	1.07	0.02	0.02	0.02
Lead (PP)	1.00	<1.00	<1.00	1.00	2.00	2.00	<1.00	1.00	1.00	1.0
Magnesium	1.00	2.86	2.08	3.12	2.60	1.82	1.69	1.10	1.30	1.3
Manganese	1.00	1.05	0.80	0.70	0.85	1.45	0.23	0.07	2.80	0.07
Potassium	1.00	1.27	1.65	1.19	1.58	1.54	1.54	1.65	1.42	1.04
Selenium (PP)	1.00	<1.00	<1.00	12.20	<1.00	<1.00	<1.00	1.00	1.00	1.0
Sodium	1.00	0.67	1.58	0.62	0.92	0.34	1.33	1.25	1.33	1.58
Zinc (PP)	1.00	<2.10	<1.70	<1.55	<2.70	3.30	<1.80	1.05	1.00	2.55
Sum:	12.0	<18.12	<15.70	<25.87	<17.39	<20.64	<13.31	10.05	12.67	11.42
Mean:	1.00	<1.51	<1.31	<2.16	<1.45	<1.72	<1.11	0.75	0.97	0.87

(PP) = Priority pollutant.

(<) Symbol used to denote compound was reported at actual concentration and was below the detection limits.

Notes: 1. Background sample concentration from monitoring well B101S.
2. Table is for normalized total metal concentrations.

Table 7-1

SUMMARY OF PRESENT AND POTENTIAL HUMAN AND ENVIRONMENTAL EXPOSURE SCENARIOS AND THEIR RESULTING RISKS

BIG RIVER SAND COMPANY SUPERFUND SITE

Exposure Type	Transport/ Exposure Media	Receptor Point	Primary Exposure Route(s)	Scenario	Results and Conclusions
Present Exposure	Contaminated soils	On-site worker	Inhalation Ingestion Dermal contact	Exposure to constituents detected in soil material while working on-site.	Total Hazard Index 0.1834. Incremental total carcinogenic risk 9.53×10^{-7}. Below acceptable risk levels.
		Downwind residents	Inhalation	Inhalation of volatilized or particulate-bound contaminants.	Should be negligible based on on-site estimated exposure levels.
	Groundwater	Eisenring family	Ingestion	Consumption of drinking water from existing well.	Total Hazard Index-Adult 1.3068. Total Hazard Index-Child 4.5803. Incremental total carcinogenic risk 8.57×10^{-5}. Potential health hazard exists, but concentrations of all constituents below their respective MCLs/KALs.
	Surface water	On-site ponds	Impacts on aquatic ecology	Concentrations of contaminants measured in pond water and sediment qualitatively assessed.	Concentrations of contaminants found are consistent with natural waters; no anticipated adverse environmental impacts.
Potential Future Exposure	Groundwater	Assume new domestic well on-site	Ingestion	Consumption of drinking water from existing monitoring well E101S.	Total Hazard Index-Adult 0.8354. Total Hazard Index-Child 2.9240. No increased incremental carcinogenic risk. Potential health hazard exists, but concentrations of all constituents below their respective MCLs/KALs.
Background Exposures	Groundwater	Assume new domestic well on-site	Ingestion	Consumption of drinking water from existing monitoring well B101S.	Total Hazard Index-Adult 0.3889. Total Hazard Index-Child 1.3613. No increased incremental carcinogenic risk. Potential health hazard exists, but concentrations of all constituents below their respective MCLs/KALs.

Table 10-1

Ground Water Sampling Cost Estimates

A.	Current cost for sample collection (includes labor, travel, lodging and subsistence for two people)	$2,150
B.	Current cost for routine water analysis (five samples, total metals)	$1,450
C.	Total present cost	$3,600
D.	Future cost if sampling conducted in year five (maximum cost, interest rate at ten percent)	$5,800

STATE OF KANSAS

45

RECEIVED
JUN 27 1988
SUPERFUND BRANCH

DEPARTMENT OF HEALTH AND ENVIRONMENT
Forbes Field
Topeka, Kansas 66620-0001
Phone (913) 296-1500

Mike Hayden, *Governor*

Stanley C. Grant, Ph.D., *Secretary*
Gary K. Hulett, Ph.D., *Under Secretary*

June 24, 1988

Mr. Robert Morby
U. S. EPA -- Region VII
726 Minnesota Avenue
Kansas City, Kansas 66101

Dear Mr. Morby,

The Department has reviewed the Remedial Investigation (RI), Feasibility Study (FS) and the Proposed Plan (PP) for the Big River Sand Company Site, Wichita, Kansas. The Department concurs with the U. S. Environmental Protection Agency's determination this site does not pose a threat to public health and welfare or to the environment. We agree additional remedial measures at this site are not appropriate and the no-further-action alternative is the preferred selected remedy at this site.

The Department recommends the U.S. Environmental Protection Agency initiate the appropriate procedures to delete the Big River Sand Company from the National Priorities List.

Sincerely,

James A. Power, Jr., P.E.
Director
Division of Environment

JAP:cas

BIG RIVER SAND & GRAVEL COMPANY
SUPERFUND SITE
WICHITA, KANSAS

ADMINISTRATIVE RECORD INDEX

Administrative Record Index
not included

U.S. ENVIRONMENTAL PROTECTION AGENCY
CONTRACT NO. 68-01-7351 (TES IV)
WORK ASSIGNMENT NO. 570

JUNE 1988

RECORD OF DECISION

RESPONSIVENESS SUMMARY

BIG RIVER SAND COMPANY SITE

WICHITA, KANSAS

Prepared By:

U.S. Environmental Protection Agency

Region VII

Kansas City, Kansas

June 1988

The Responsiveness Summary provides EPA and State decision makers with information on major issues raised by the public regarding the site and the remedial alternatives developed. It also documents how public comments were taken into account in the decision-making process.

As required by CERCLA, a notice and brief analysis of the Proposed Plan were published on May 31, 1988, in The Wichita Eagle-Beacon. The public notice provided a brief overview of the site and identified the lead agency (EPA) and the support agency (KDHE). The notice informed the public of its role in the decision-making process and provided information on the public comment period, the location of the information repositories and methods by which the public could submit oral and written comments. The notice also presented the preferred alternative and requested public comments on the alternative.

To provide the community with a reasonable opportunity to submit written and oral comments on the Proposed Plan and the RI report, the EPA and KDHE established a public comment period from May 31 through June 20, 1988. The EPA and KDHE also invited requests for a public meeting in the community to present the Proposed Plan and RI report, answer questions and receive comments.

The Proposed Plan, RI report and Administrative Record file were made available for public review at the Sedgwick County Public Library, Main Branch, 223 S. Main Street, Wichita, Kansas, and at the EPA Region VII Library in Kansas City, Kansas.

No comments were received by EPA or the State on the Proposed Plan, the preferred alternative or the Administrative Record file during the public comment period.